

Enhanced superhyperfine structure of the EPR spectra of a U^{3+} ion introduced into the Van Vleck paramagnet $LiTmF_4$

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Abstract

The observation of the superhyperfine structure (SHFS) in EPR spectra due to enhanced nuclear magnetism is reported. The X-band spectrum of a U^{3+} ion introduced into the Van Vleck paramagnet $LiTmF_4$ is measured in the temperature range of 5-20 K and compared with the spectra of $LiLuF_4:U^{3+}$ and $LiYF_4:U^{3+}$ single crystals. The spectra reveal well-resolved and strikingly different SHFS. The SHFS of $Li(Lu, Y)F_4:U^{3+}$ is due to the fluorine ions forming the nearest surroundings of the U^{3+} ion. The main contribution to the SHFS of the U^{3+} spectrum in $LiTmF_4$ comes from the Tm^{3+} ions with a highly enhanced nuclear gyromagnetic tensor. © 2008 Pleiades Publishing, Ltd.

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